

**What is claimed is:**

1. A metal alloy comprising an alloy metal and greater than about 4 atomic % of at least one P-group alloying element.
- 5 2. A metal alloy of claim 1 wherein the P-group alloying element is present at a level of 4 atomic % to 50 atomic %.
3. The metal alloy of claim 1 wherein said P-group alloying element is selected from the group consisting of carbon, nitrogen, phosphorous, silicon, boron, and  
10 mixtures thereof.
4. A metal alloy according to claim 1, wherein said at least one P-group alloying element comprises 16.0 atomic % B, 4.0 atomic % C, and 5.0 atomic % Si.
- 15 5. A metal alloy according to claim 1 wherein the alloy metal is selected from the group consisting of iron, chrome, molybdenum, tungsten, manganese, cobalt, nickel, copper, and mixtures thereof.
6. A method for reducing the thermal and/or electrical conductivity of a  
20 metal alloy composition comprising:
  - (a) supplying a metal alloy composition; and
  - (b) supplying a P-group alloying element;

(c) mixing said metal alloy composition and said P-group alloying element wherein said P-group alloying element is present at a level to reduce the thermal/and or electrical conductivity of said metal alloy composition.

5           7.     A method of reducing the thermal and/or electrical conductivity of a metal alloy composition comprising:

- (a) supplying a base metal with a free electron density
  - (b) supplying a P-group alloying element
  - (c) combining said P-group alloying element with said base metal and
- 10 decreasing the free electron density of the base metal.

8.     The method of claim 7 wherein the free electron density of the base metal is reduced from its base metal value, and wherein said free electron density is generally representative of a fully filled outer shell after combination with said P-group alloying

15 element:

9.     The method of claim 7 wherein said P-group alloying element is selected from the group consisting of carbon, nitrogen, phosphorous, silicon, boron, and mixtures thereof.

20       10.    The method of claim 7 wherein the base metal is selected from the group consisting of iron, nickel, cobalt, aluminum, copper, zinc, titanium, zirconium, niobium, molybdenum, tantalum, vanadium, hafnium, tungsten, manganese, and combinations thereof.